REMARKS

The Office Action mailed November 29, 2006, has been reviewed and carefully considered. Claims 18 and 21 have been amended. Claims 1-2, 5, 8, 11, 12, 14, 17-18, 21 and 23 are pending in the application.

In paragraph 6 on page 3 of the Office Action, claims 17, 18 and 21 were rejected under 35 U.S.C. § 101.

Applicants respectfully traverse the rejection.

A claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. According to claim 17, program instructions are provided that impart functionality when employed as a computer component by implementing specific data manipulation functions. More specifically, a spot function is defined, the spot function is scaled and the scaled spot function is used to print. Thus, claim 17 provides computer-readable medium encoded with a computer program that defines structural and functional interrelationships between the computer program and the rest of the computer.

Applicants therefore respectfully submit that the rejection of claims 17, 18 and 21 under 35 U.S.C. 101 is improper and should be withdrawn.

In paragraph 8 on page 4 of the Office Action, claims 1-2, 7-8, 17-18 and 23 were rejected under § 103(a) as being unpatentable over Curry in view of Allen. In paragraph 9 on page 6 of the Office Action, claims 5, 11 and 21 were rejected under § 103(a) as being unpatentable over Curry and Allen in further view of obvious engineering design choices. In paragraph 10 on page 7 of the Office Action, claim 13 was rejected under § 103(a) as being

unpatentable over Curry and Allen in further view of Vaswani. In paragraph 11 on page 7 of the Office Action, claim 14 was rejected under § 103(a) as being unpatentable over Curry and Allen in further view of Cunniff.

Applicants respectfully traverse the rejections.

Applicants' independent claim 1 recites defining a spot function that combines two functions selected to provide asymmetrically changing of the shape of a spot for use in a halftone cell, scaling the spot function according to grayscale levels using a parameterized spot radius scaling function that varies according to a value of a first and second spot function ordinate and an asymmetric shape changing scaling function based on a gray level for the spot, and printing using the scaled spot function, wherein the spot function is described by:

$$f(x,y)=\frac{1}{2}\left(\cos(\pi x/p_x)+\frac{1}{S(p,r)}\cos(\pi y/p_y)\right)$$

where x and y are the first and second spot function ordinates, p_x scales ordinate x, p_y scales ordinate y, p is a spot shape parameter for controlling the shape of the spot, S(p,r) is a scaling function, and r is the radius of the spot. Similar limitations are rectied in independent claims 7 and 17.

I. CURRY, ALLEN, VASWANI AND CUNNIFF, ALONE OR IN COMBINATION, FAIL TO DISCLOSE, TEACH OR SUGGEST DEFINING A SPOT FUNCTION THAT COMBINES TWO FUNCTIONS SELECTED TO PROVIDE ASYMMETRICALLY CHANGING OF THE SHAPE OF A SPOT.

Curry suggests that the shape of a spot may be changed. Curry also discloses the use of an ellipse for a spot. However, Curry fails to describe how the ellipse is defined or how the shape of a spot is changed. Curry discloses that a spot may be rotated. Curry also mentions that

a halftone dot may be rendered by growing Gaussians of "the shape of the sport." However, Curry fails to suggest how the shape of the spot may be asymmetrically changed. Curry also fails to suggest a spot functions that combines two functions that are selected to provide the asymmetrical changing of the shape of a spot.

Allen discloses a visual sensor that includes a first portion having a first imaging characteristic and a second portion proximate to the first portion having a second imaging characteristic. The imaging characteristic of one of the first and second portions is less sensitive to an imaging parameter than the imaging characteristic of the other of the first and second portions. The imaging parameter is at least one parameter chosen from the set of spot size, spot shape and spot ellipticity.

However, disclosing that a first protion of a sensor is less sensitive to a spot shape, for example, has nothing to do with defining a spot shape.

Vaswani and Cunniff are silent regarding changing the shape of a spot used for halftoning.

Accordingly, Curry, Allen, Vaswani And Cunniff, alone or in combination, fail to disclose, teach or suggest defining a spot function that combines two functions selected to provide asymmetrically changing of the shape of a spot.

II. CURRY, ALLEN, VASWANI AND CUNNIFF, ALONE OR IN COMBINATION, FAIL TO DISCLOSE, TEACH OR SUGGEST SCALING THE SPOT FUNCTION ACCORDING TO GRAYSCALE LEVELS USING A PARAMETERIZED SPOT RADIUS SCALING FUNCTION THAT VARIES ACCORDING TO A VALUE OF A FIRST AND SECOND SPOT FUNCTION ORDINATE AND AN ASYMMETRIC SHAPE CHANGING SCALING FUNCTION BASED ON A GRAY LEVEL FOR THE SPOT.

The final Office Action admitted that Curry failed to suggest scaling the spot function according to grayscale levels using a parameterized spot radius scaling function that varies according to a value of a first and second spot function ordinate and that the shape changing is asymmetric. Curry discloses that a shape of a spot may be changed. However, Curry fails to disclose how the shape of a spot may be changed. Moreover, Curry fails to suggest how to define a spot function that combines two functions selected to provide asymmetrically changing of the shape of a spot. Even further, Curry fails to suggest scaling a spot function. Curry describes how to scale an image, using a scaling factor to compensate for any difference in the slowscan and fastscan resolutions, scaling the locations of boundaries to the halftoner memory array and graduating the dot to correlate to system clock signals.

More specifically, however, Curry fails to disclose, teach or suggest scaling the spot function according to grayscale levels using a parameterized spot radius scaling function that varies according to a value of a first and second spot function ordinate and an asymmetric shape changing scaling function. Still further, Curry fails to disclose, teach or suggest that the spot function is scaled using a function that varies according to an asymmetric shape changing scaling function based on a gray level for the spot.

The final Office Action stated that Allen discloses scaling the spot function according to grayscale levels using a parameterized spot radius scaling function that varies according to a value of a first and second spot function ordinate and that the shape changing is asymmetric.

Curry discloses that a shape of a spot may be changed. However, Applicants respectfully submit that Allen merely discloses a visual sensor that includes a first portion having a first imaging characteristic and a second portion proximate to the first portion having a second imaging characteristic. The imaging characteristic of one of the first and second portions is less sensitive to an imaging parameter than the imaging characteristic of the other of the first and second portions. The imaging parameter is at least one parameter chosen from the set of spot size, spot shape and spot ellipticity.

However, disclosing that a first protion of a sensor is less sensitive to a spot shape, for example, has nothing to do with defining a spot shape. Allen merely descibes a sensor for detecting image parameters. Allen fails to disclose, teach or suggest anything having to do with scaling a spot function or the halftoning manipulation itself.

Vaswani and Cunniff are silent regarding scaling the spot function according to grayscale levels using a parameterized spot radius scaling function that varies according to a value of a first and second spot function ordinate and an asymmetric shape changing scaling function based on a gray level for the spot.

Accordingly, Curry, Allen, Vaswani And Cunniff, alone or in combination, fail to disclose, teach or suggest scaling the spot function according to grayscale levels using a parameterized spot radius scaling function that varies according to a value of a first and second spot function ordinate and an asymmetric shape changing scaling function based on a gray level for the spot.

III. CURRY, ALLEN, VASWANI AND CUNNIFF, ALONE OR IN COMBINATION, FAIL TO DISCLOSE, TEACH OR SUGGEST A SPOT FUNCTION DESCRIBED BY:

$$f(x,y)=\frac{1}{2}\left(\cos(\pi x/p_x)+\frac{1}{S(p,r)}\cos(\pi y/p_y)\right)$$

WHERE x AND y ARE THE FIRST AND SECOND SPOT FUNCTION ORDINATES, p_x SCALES ORDINATE x, p_y SCALES ORDINATE y, p IS A SPOT SHAPE PARAMETER FOR CONTROLLING THE SHAPE OF THE SPOT, S(p,r) IS A SCALING FUNCTION, AND r IS THE RADIUS OF THE SPOT.

The final Office Action admitted that Curry failed to suggest a spot function described by:

$$f(x,y)=\frac{1}{2}\left(\cos(\pi x/p_x)+\frac{1}{S(p,r)}\cos(\pi y/p_y)\right),$$

where x and y are the first and second spot function ordinates, p_x scales ordinate x, p_y scales ordinate y, p is a spot shape parameter for controlling the shape of the spot, S(p,r) is a scaling function, and r is the radius of the spot.

However, the final Office Action stated that Allen discloses the above spot function. The final Office Action refers to column 4, lines 16-23 of Allen. However, Allen merely describes a sensor for detecting image parameters. More specifically, Allen discloses a visual sensor that includes a first portion having a first imaging characteristic and a second portion proximate to the first portion having a second imaging characteristic. The imaging characteristic of one of the first and second portions is less sensitive to an imaging parameter than the imaging characteristic of the other of the first and second portions. The imaging parameter is at least one parameter chosen from the set of spot size, spot shape and spot ellipticity.

However, disclosing that a first protion of a sensor is less sensitive to a spot shape, for example, has nothing to do with defining a spot shape. Rather, Allen is merely concerned with detecting image parameters – not how a spot functin is defined. As stated above, Allen fails to

disclose, teach or suggest anything having to do with scaling a spot function or the halftoning manipulation itself.

Vaswani and Cunniff are silent regarding an equation for defining a spot function.

Accordingly, Curry, Allen, Vaswani And Cunniff, alone or in combination, fail to disclose, teach or suggest an equation for defining and scaling a spot function.

Thus, Applicants respectfully submit that independent claims 1, 7 and 17 are patentable over Curry, Allen, Vaswani And Cunniff.

Dependent claims 2, 5, 8, 11, 13, 14, 18 and 21 are also patentable over the references, because they incorporate all of the limitations of the corresponding independent claims 1, 7 and 17, respectively. Further dependent claims 2, 5, 8, 11, 13, 14, 18 and 21 recite additional novel elements and limitations. Applicants reserve the right to argue independently the patentability of these additional novel aspects. Therefore, Applicants respectfully submit that dependent claims 2, 5, 8, 11, 13, 14, 18 and 21 are patentable over the cited references.

On the basis of the above amendments and remarks, it is respectfully submitted that the claims are in immediate condition for allowance. Accordingly, reconsideration of this application and its allowance are requested.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Attorney for Applicant, David W. Lynch, at 423-757-0264.

Respectfully submitted,

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